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STREAMSIDE MANAGEMENT ZONE GUIDELINES AND PRESCRIPTIONS

MONTANA DEPARTMENT OF STATE LANDS

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DEFINITIONS

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The Streamside Management Zone (SMZ) consists of the stream itself and an adjacent area of varying width where management practices that might affect water quality, fish, or other aquatic resources are modified. The Streamside Management Zone is not a zone of exclusion, but a zone of closely managed activity. It is a zone which acts as an effective filter and absorptive zone for sediment; maintains shade; protects aquatic and terrestrial riparian habitats; protects channel and streambanks; and promotes floodplain stability.

The riparian zone consists of those areas and biotic communities which are predominately influenced by high water tables, usually occurring adjacent to surface water.

An ephemeral stream is a stream or portion of a stream which flows only in direct response to precipitation or snowmelt. Its channel is at all times above the water table and generally lacks obvious channel characteristics.

An intermittent stream is a stream which flows only at certain times when it receives water from springs or from some source such as snowmelt. Its channel is below the water table for a portion of the year. Defined channel characteristics are generally present.

A perennial stream is a stream that flows throughout the year and from source to mouth.

APPLICATION

These guidelines apply to all perennial streams, most intermittent streams, and some ephemeral streams, subject to the discretion of the manager with input from hydrologist or fisheries biologist.

Riparian zones may occur outside of SMZs, such as along lakes and wetlands. These guidelines may be applicable to riparian zones in these locations.

MANAGEMENT OBJECTIVES FOR SMZs

The water resource objective for SMZs is to protect the stream and its adjacent environment so as to maintain water quality and water resources at near natural levels.

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The timber management objectives for SMZs are:

- 1) Maintain SMZs in commercial timber production.
- 2) Manage SMZs for profitable (not necessarily maximum profit) timber production. Adequate measures for protecting water values must be of primary importance.

#### MANAGEMENT DIRECTION FOR SMZs

Management direction in SMZs is guided by water resource and timber management objectives. Fisheries and wildlife considerations will be an integrated part of these objectives. Acceptable practices will be selected to meet the objectives. The intent is that all SMZs will be managed, providing adequate measures are taken for protection of water values.

Silvicultural prescriptions, rotation lengths, species composition, and scheduling of cutting can be manipulated to provide the necessary protection for water quality.

Most SMZs have not been site specifically determined. They have been estimated on maps, based on topographical features. As project level activities occur, the SMZs will be located and mapped.

The rotation length in the SMZ will generally be longer than stands outside of the SMZ. Analysis on the Kootenai National Forest showed 180 years to be an optimum rotation age for SMZs (2).

Timber harvesting within an SMZ should be done under the following guidelines:

- 1) Retain riparian zone hardwood species.
- 2) Maximize the retention of bank-edge trees which are key to channel stabilization until replacement trees are available.
- 3) Re-establish coniferous stands where they originally existed.
- 4) Maintain stream temperature within legal limits.
- 5) Maintain channel stability within acceptable limits.
- 6) Maintain or provide sufficient ground cover to trap sediment.
- 7) Avoid the addition of woody debris from logging operations to the stream channel.

#### DEVELOPING PRESCRIPTION FOR SMZs

##### SILVICULTURE

Timber production in the SMZ is constrained by the need to manage for water quality. The SMZ may have site characteristics



which encourage intensive management, but some of the practices involved may not be consistent with management objectives. There are basically two scenarios for prescriptions for SMZs. They are:

1) Even-aged management

Small clearcuts (generally less than 10 acres) are considered an appropriate method to manage SMZs if certain conditions are met. The total length of stream exposed to increased solar radiation must be kept at a level below which adverse temperature increases will occur. Equipment operation and directional falling restrictions must be applied. Slash disposal may require some hand work.

- a) Where risk of wind-throw is moderate to high, removal of all full crowned, old growth trees may be necessary. Numerous tipped over trees in the SMZ may result in an increase in sediment and debris.
- b) Under an even-aged prescription, units in the SMZ should:
  - have continuous openings along streams not exceeding 600 ft. in length;
  - have cover areas between openings at least 400 ft. wide;
  - have openings at any point in time not to exceed 20% of each stream length;
  - not have openings resulting from timber harvest opposite each other on both sides of a stream.

2) Uneven-aged management

Uneven-management within an SMZ is usually accomplished through single tree selection with directional falling and equipment operating restrictions. The stands created or maintained include three or more distinctly different age classes. This prescription for SMZs may be appropriate where:

- a) Stream channel banks are unstable and clearcuts would cause an erosion hazard.
- b) Maintenance of conifer shade cover is essential.
- c) Regeneration of seral species is not intended.
- d) Low blowdown potential of the tree species in the unit.
- e) Good access exists for regular entries.
- f) Slash treatment is not a problem. Tree length skidding may be necessary. Harvest species and tree heights will help determine feasibility.





- g) Treatment will be economical with limited volumes and frequent entries.
- h) Skidding systems will not significantly damage the residual trees.

#### SALE PLANNING

- 1) Delineate SMZs in the sale area on maps and aerial photographs. Determine the width of the SMZ based on stream status, terrain, landform and water use. See Appendix 1 for information on determining width of the SMZ.
- 2) It is generally easier to meet the SMZ objective if permanent roads are kept out of the SMZ, with the exception of creek crossings. Employment of a more expensive skidding or yarding systems may be a trade off necessary to preserve the streamside environment.
- 3) Streamcourse crossings will insure fish passage, non-erosive water velocities, channel stability, and erosion control on cuts, fills, and road surface.
- 4) Plan the logging and transportation system so management can be efficiently applied in the future.
- 5) Consider a separate unit for an SMZ. Silvicultural prescription, logging methods, and slash disposal will usually differ in the SMZ. Making the SMZ a separate unit will make it easier to administer.
- 6) A minimum 50-foot wide equipment restriction zone along the stream in which the ground surface is not disturbed by equipment, is recommended.
- 7) As stream orientation approaches north-south, preservation of streamside vegetation becomes increasingly important for maintaining shade cover.

#### FELLING AND YARDING

Proper control of felling and yarding in the SMZ probably affords the greatest potential for success.

Directional falling should be employed where there is a good chance that tree falling would result in getting debris into a stream channel, and where existing hardwoods could not be adequately protected with conventional harvesting practices. Directional falling can also be used to protect wet or compactible soils.

The proper yarding system to employ is one which most economically meets the SMZ objectives. The system must get the logs out, while providing the necessary protection to the stream, its banks, critical upslope areas, the residual stand, and ground cover.



When cable yarding, full suspension is required when yarding across perennial streams. Full suspension is also desirable when yarding across unstable areas.

With tractor yarding systems, equipment operation should generally be limited to stable terraces above stream sources. Logs below the stable terraces should be winched to the terrace. Equipment should not be operated within 50' of the channel banks.

#### EROSION CONTROL

Erosion control measures are key elements in preventing long-term degradation of water quality. Proper location and construction of skid trails and water bars will result in run-off from skid trails being distributed onto undisturbed litter well away from the drainage channels.

Sensitive disturbed areas should be seeded to grass as soon as logging ceases in an area.

#### STREAM CLEANOUT

Prevention of debris deposition is generally better and less costly than removal.

Equipment such as tractors and rubber tired skidders should not be used directly in any stream for cleanout, except in special cases and subject to prior review of a hydrologist and fisheries biologist.

Stream cleanout should be done by hand. Hand piling should remove material from the channel and place it well above the normal high water mark.

Pre-existing stable debris, such as keyed in logs, should not be removed.

#### SLASH DISPOSAL/SITE PREPARATION

The same equipment restrictions that apply for timber harvesting apply during slash disposal and site preparation.

Dozer scarification or piling is not permitted unless there is no possibility of excessive soil compaction or stream siltation.

Only hand constructed fuel breaks are recommended within an SMZ.

Steep slopes containing material which would roll down-slope and fall into a stream during burning should receive special attention. The area may have to be hand piled on a stable location, or the area may have to be whole-tree yarded.



## References

- (1) Caird, D. J., L. E. Siverts, J. Christner, 1978. Streamside Management Unit Guidelines. Willamette National Forest. Eugene, Oregon. 28 p.
- (2) Rainville, R. P., A. G. Christensen, S. R. Johnson, J. D. Park, L. H. Meshe, n.d. Riparian Zone Management Prescription-Rotation Age. Kootenai National Forest. Libby, Montana. 19 p.





## APPENDIX #1

### DETERMINING STREAMSIDE ZONE WIDTH

The prescribed width for a streamside management zone (SMZ) is dependent on stream status, terrain, landforms, and water use. A perennial stream generally requires a wider SMZ than an intermittent stream. Steep slopes along the channel banks dictate the need for a wider SMZ than gentle slopes. Erosive landforms should have wider SMZs than less erosive landforms. A downstream domestic or irrigation use may require a wider SMZ than if there were no adjudicated use.

Guidelines for determining SMZ width should be used only as guidelines. Results should be tempered with the factors listed above, and others, such as the number on-the-ground obstructions, and personal judgement.

For sensitive streams (from SCS)

SMZ width (slope distance in ft.) =  $100 + 4 (\% \text{ slope})$

For less sensitive streams

SMZ width (slope distance in ft.) =  $50 + 3 (\% \text{ slope})$

Other guidelines are available, such as Guidelines For Controlling Sediment From Secondary Logging Roads by Packer and Christianson.

This guideline incorporates, among other items, the amount of debris on the ground. For example, in topography composed of gravelly material, with log obstructions every 9 feet, this guideline suggests a 72 foot wide protective strip.

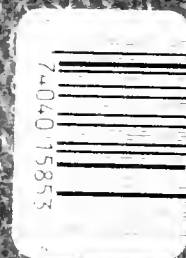
The Bureau of Land Management recently published guidelines in their Garnet Resource Area Management Plan/EIS. It calls for "buffer zones" in their General Forest Management Area based on land slope as follows:

<u>Land Slope</u>	<u>For General Situation</u>	<u>For Sensitive Soils</u>
10%	45 feet	75 feet
20%	65 feet	130 feet
30%	85 feet	170 feet
40%	105 feet	210 feet



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